Purpose

The purpose of this lesson is for students to create, analyze and compare histograms, box plots and scatter plots and evaluate the spread of the data.

Learning Objectives

- Summarize, represent, and interpret data on a single count or measurement variable
- Represent data with plots on the real number line with a histogram
- Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread of two or more different data sets.

Materials Required

- Data table
- 2 Copies Blank Frequency Table (optional)
- Graph paper
- Student question sheets

Teacher Preparation

- It is assumed that students have some prior knowledge of histograms, box plots and scatter plots
- Print student question sheets
- Print copies of the data table

Procedure

Plan your Histograms

1. Use the data table provided for the latitudes at 125° East to make a frequency table with bins that are 5 units wide.
2. Use the data table provided for the latitudes at 125° West to make a frequency table with bins that are 5 units wide.
3. What is the x axis for each histogram?
4. How many squares of the graph paper will you use for each bin?
5. What is the y axis for each histogram?
6. How much will each square of the graph paper represent?
7. How many squares will you need to graph the tallest bar? It is easier to compare if both histograms use the same scale.
8. What titles will you use?

Create the Histograms Using the Answers to the Planning Questions

1. Draw each set of axes using the graph paper provided.
2. Label each set of axes.
3. Add each title.
4. Using the frequency tables, draw the bars for each histogram.

Plan your Box plots

1. Use the data table provided to calculate the following for the west and the east. Remember to order the data from least to greatest before doing the calculations.

East		West	
Median	27	Median	2
Minimum	0	Minimum	0
Maximum	134	Maximum	54
First Quartile	4.5	First Quartile	0
Third Quartile	83	Third Quartile	21.5
Inter-Quartile Range	78.5	Inter-Quartile Range	21.5

2. What label will you use for each scale? (Number of tropical cyclones.)
3. How many squares of the graph paper will you use for each unit? (Accept reasonable responses.)
4. How many squares will you need for each scale? (The number of latitudes that have the number of tropical cyclones in each bin.)
5. What titles will you use? (Accept reasonable responses.)
6. Will you draw them vertically or horizontally? (Your teacher may have a preference.)

Create the Box plots Using the Answers to the Planning Questions

1. Draw the scale for each box plot using the graph paper provided.
2. Label the scales.
3. Add the titles.
4. Using the minimum, maximum, median, lower and upper quartiles for the west and the east, draw the box plots.

Plan your Scatter plots

1. What variable will be on the x-axis for each scatter plot? (Latitude in degrees North at 125° West and Latitude in degrees North at 125° East)
2. What variable will be on the y-axis for each scatter plot? (Number of tropical cyclones)
3. What titles will you use? (Accept reasonable responses.)
4. How many squares of the graph paper will you use for each unit on the x-axis for each scatter plot? (Accept reasonable responses.)
5. How many squares of the graph paper will you use for each unit on the y-axis for each scatter plot? They will be easier to compare if you use the same scale for both. (Accept reasonable responses.)

Create the Scatter plots Using the Answers to the Planning Questions

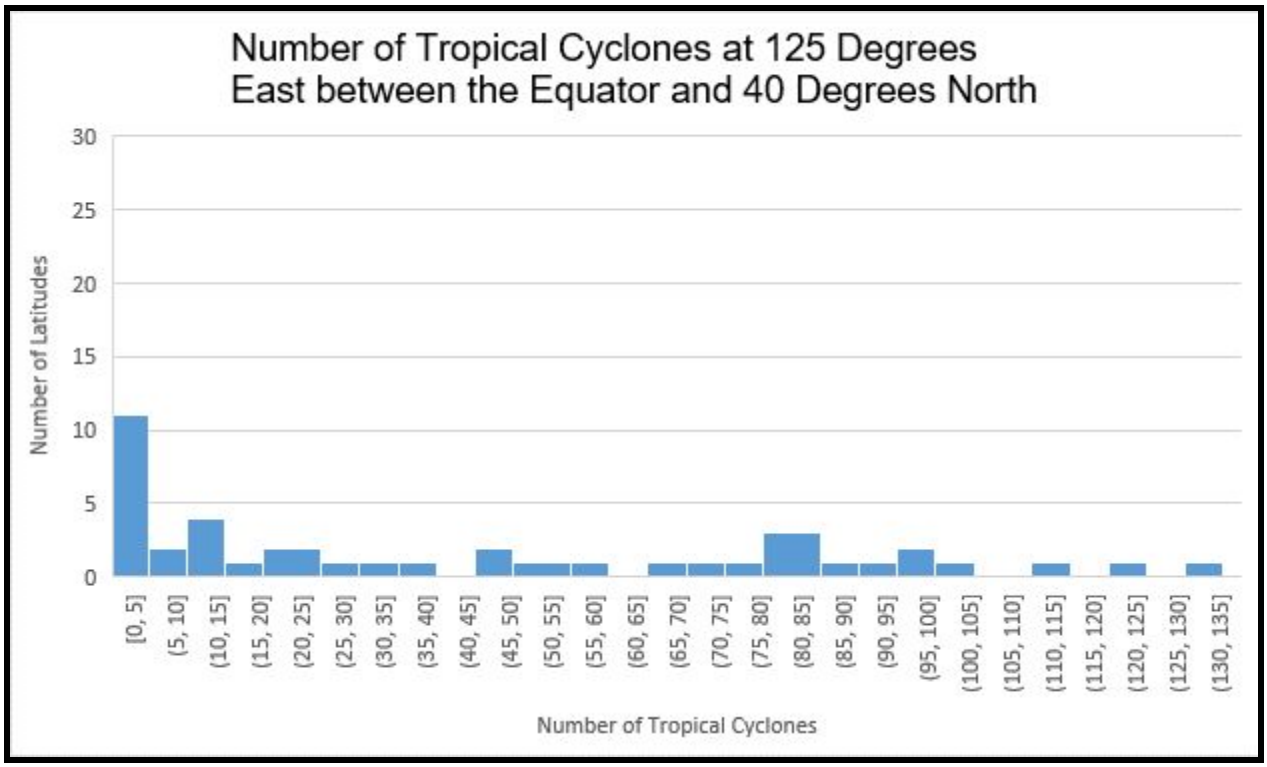
1. Draw and label the x-axis and the y-axis for each scatter plot.
2. Label each axis on both scatter plots.
3. Add the title to each scatter plot.
4. Plot each point for each scatter plot.

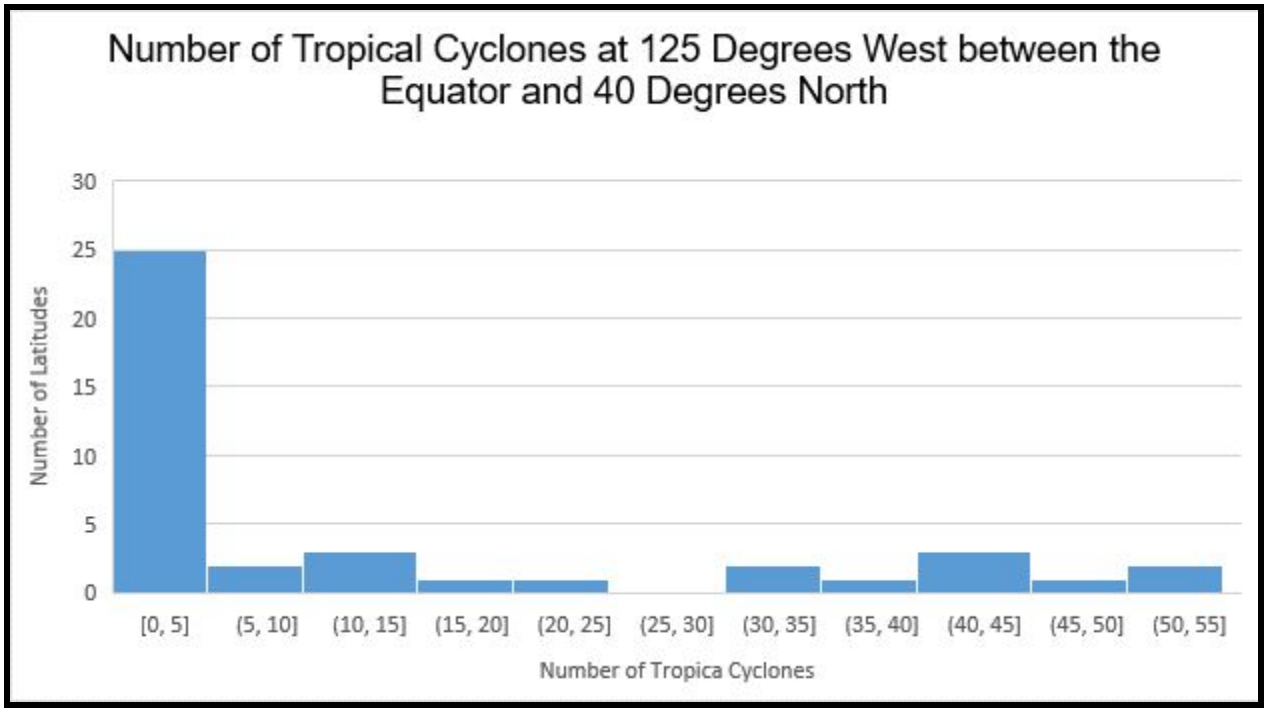
125 Degrees East		125 Degrees West	
Latitude North	Number of Tropical Cyclones	Latitude North	Number of Tropical Cyclones
0	0	0	0
1	0	1	0
2	0	2	0
3	0	3	0
4	0	4	0
5	0	5	0
6	1	6	0
7	3	7	0
8	2	8	0
9	8	9	1
10	35	10	3
11	46	11	9
12	57	12	14
13	66	13	23
14	72	14	44
15	97	15	51
16	124	16	50
17	114	17	41
18	134	18	54
19	101	19	36
20	83	20	44
21	90	21	34
22	99	22	33
23	91	23	20
24	84	24	15
25	83	25	13
26	79	26	6
27	54	27	5
28	47	28	4
29	39	29	2
30	27	30	2
31	23	31	4
32	13	32	1
33	24	33	0
34	17	34	0
35	13	35	0
36	10	36	0
37	11	37	0
38	5	38	0
39	14	39	0
40	4	40	0

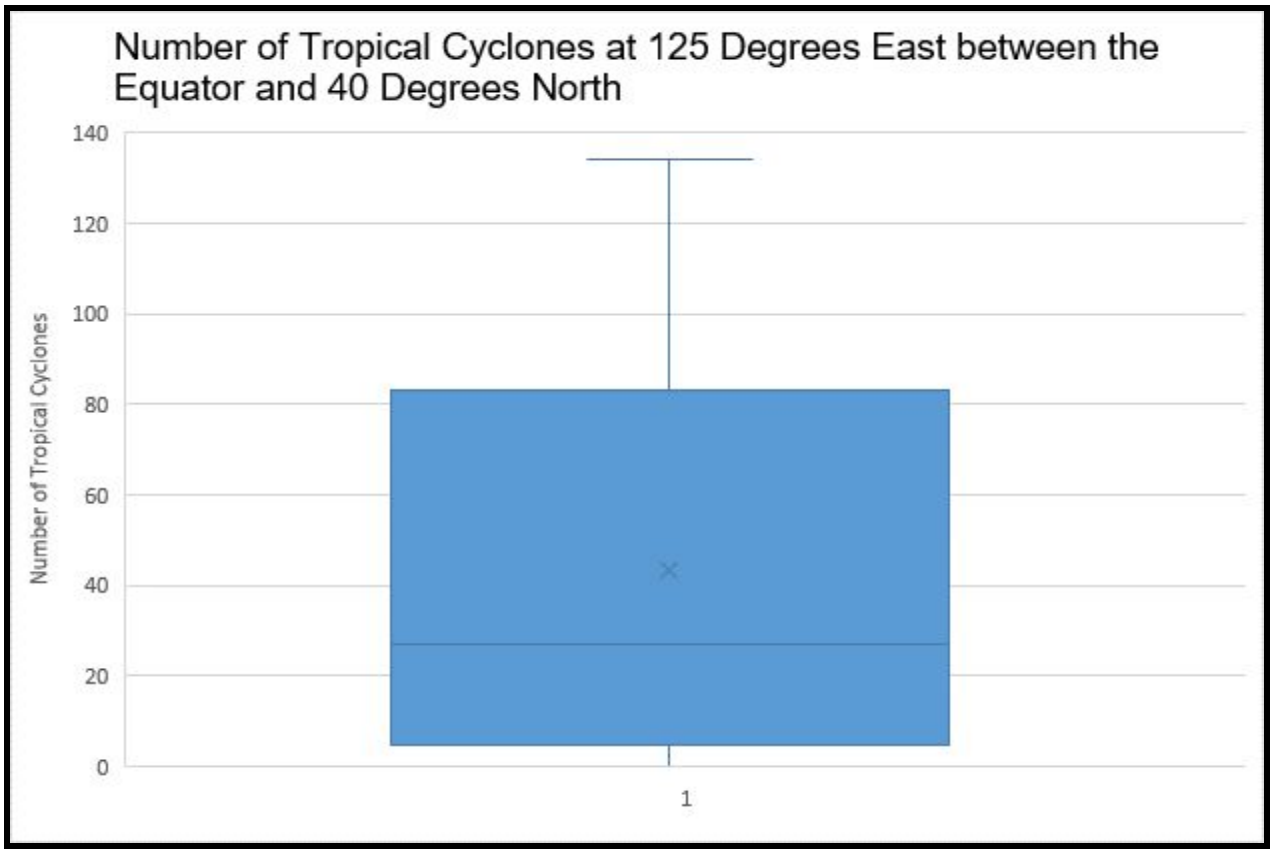
Sample Frequency Table Key

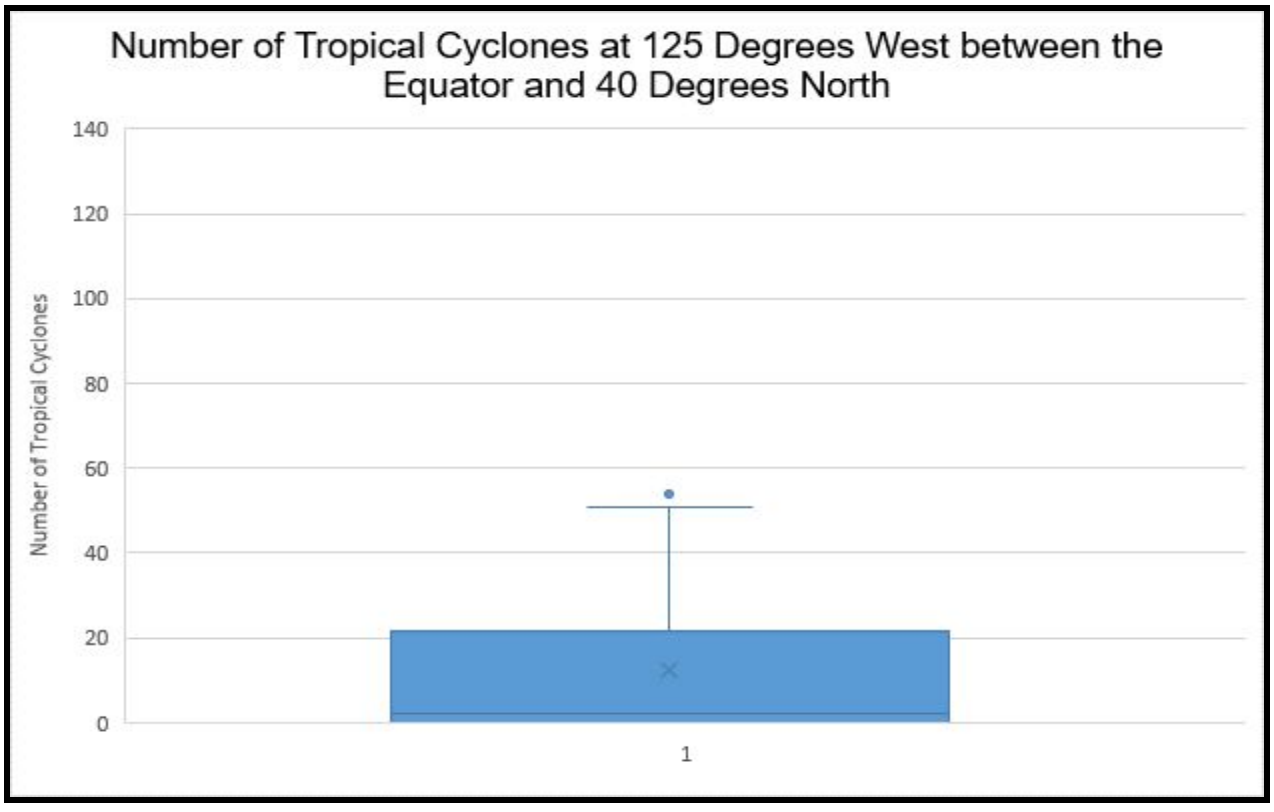
East		West	
Bin	*Frequency*	*Bin*	*Frequency*
0-5	11	0-5	25
6-10	2	6-10	2
11-15	4	11-15	3
16-20	1	16-20	1
21-25	2	21-25	1
26-30	1	26-30	0
31-35	1	31-35	2
36-40	1	36-40	1
41-45	0	41-45	3
46-50	2	46-50	1
51-55	1	51-55	2
56-60	1	56-60	0
61-65	0	61-65	0
66-70	1	66-70	0
71-75	1	71-75	0
76-80	1	76-80	0
81-85	3	81-85	0
86-90	1	86-90	0
91-95	1	91-95	0
96-100	2	96-100	0
101-105	1	101-105	0
106-110	0	106-110	0
111-115	1	111-115	0
116-120	0	116-120	0
121-125	1	121-125	0
126-130	0	126-130	0
130-135	1	130-135	0

Histogram Key – The student histograms should look similar to this.






Number of Tropical Cyclones at 125 Degrees East between the Equator and 40 Degrees North
Number of Tropical Cyclones
140
120
100
80
60
40
20
0
1


Number of Tropical Cyclones at 125 Degrees West between the Equator and 40 Degrees North
Number of Tropical Cyclones
140
120
100
80
60
40
20
0
1

Scatter Plots